Pine Plantation Financial Analysis

Excel Spreadsheet User's Instructions

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Introduction

An Excel spreadsheet has been developed which allows a forester to perform a simple growth and yield projection, along with a financial analysis, for a loblolly pine plantation. The growth and yield of the plantation is modeled within the spreadsheet using an adaptation of the TAUYIELD model developed at Virginia Tech. This model was developed for cutover, site-prepared stands of loblolly pine in the Southeast. (See http://www.fw.vt.edu/g&y_coop/tauyield.pdf for details.)

The benefits of the spreadsheet over the computer model version of TAUYIELD include the following:

- Provision for three product specifications (e.g. pulpwood, chip-n-saw and sawtimber)
- The ability to specify establishment costs
- The computation of internal rate of return
- More interactive and intuitive interface
- A printer and user-friendly page output
- The ability to modify the model in the future as more data become available from DOF's growth and yield plots.

Using the Spreadsheet

Open the spreadsheet file. The sheet is protected, meaning that the user can only enter values into certain cells. Removing the protection would create problems if the user accidentally changed values in other cells that may change the results of the model and financial analysis.

To run pine plantation simulation the user must enter the following values in the unprotected cells. Each unprotected cell has a red-comment tag in its upper right-hand corner. Using the mouse to place the cursor over a cell will display the comment. The comment will instruct the user on what value to place in the cell.

The unprotected cells in which the user may enter values are as follows, following row and column order:

- B4: Tract #
- F4: Landowner name (prepared for)
- B5: Acres of the plantation

- F5: Year trees were (or will be) planted

- B6: Site index of the stand (base age 25)
- J9: Number of trees planted (or surviving) per acre

- D10: Cost per acre of site prep
- D11: Cost per acre of planting
- C12: Year of release (in plantation age, 0 for year planted)
- D12: Cost per acre of release

- I10: Age of first thinning
- M10: Trees per acre left after 1st thinning

- I11: Age of second thinning
- M11: Trees per acre left after 2nd thinning

- I12: Age of third thinning
- M10: Trees per acre left after 3rd thinning

- I13: Harvest age

- H25: An alternate rate of return for the financial analysis (e.g. long-term Treasury bond yield)
- H26: Inflation rate (will be used to account for inflation of stumpage prices)
- K25: Stumpage price for pulpwood
- K26: Stumpage price for chip-n-saw
- K27: Stumpage price for sawtimber

- D28: Internal rate of return(**This cell cannot be edited but you must press Ctrl-R to update its value)**

- C30: Forester's name

"What-If" Analysis

After entering the stand specifics in the unprotected cells as listed above, the user may modify any of the cells and the rest of the spreadsheet will be automatically updated.

The only exception to this automatic update is the Internal Rate of Return in cell D28. A goal-seeking algorithm must be run to solve for the IRR. Pressing Ctrl-R runs a macro that updates IRR.

Printing Results

The print area is defined as a single page on the "Financial" sheet. Simply choose File/Print and print to you default printer, or select another printer through the print dialog.

Saving Results

The user can save the spreadsheet, which will save the latest changes to the user-updateable cells. Alternatively, the user can use Save As .. to save a new copy. The user may wish to save the sheet with the Tract number and parcel number as part or all of the title.

Computation Sheet

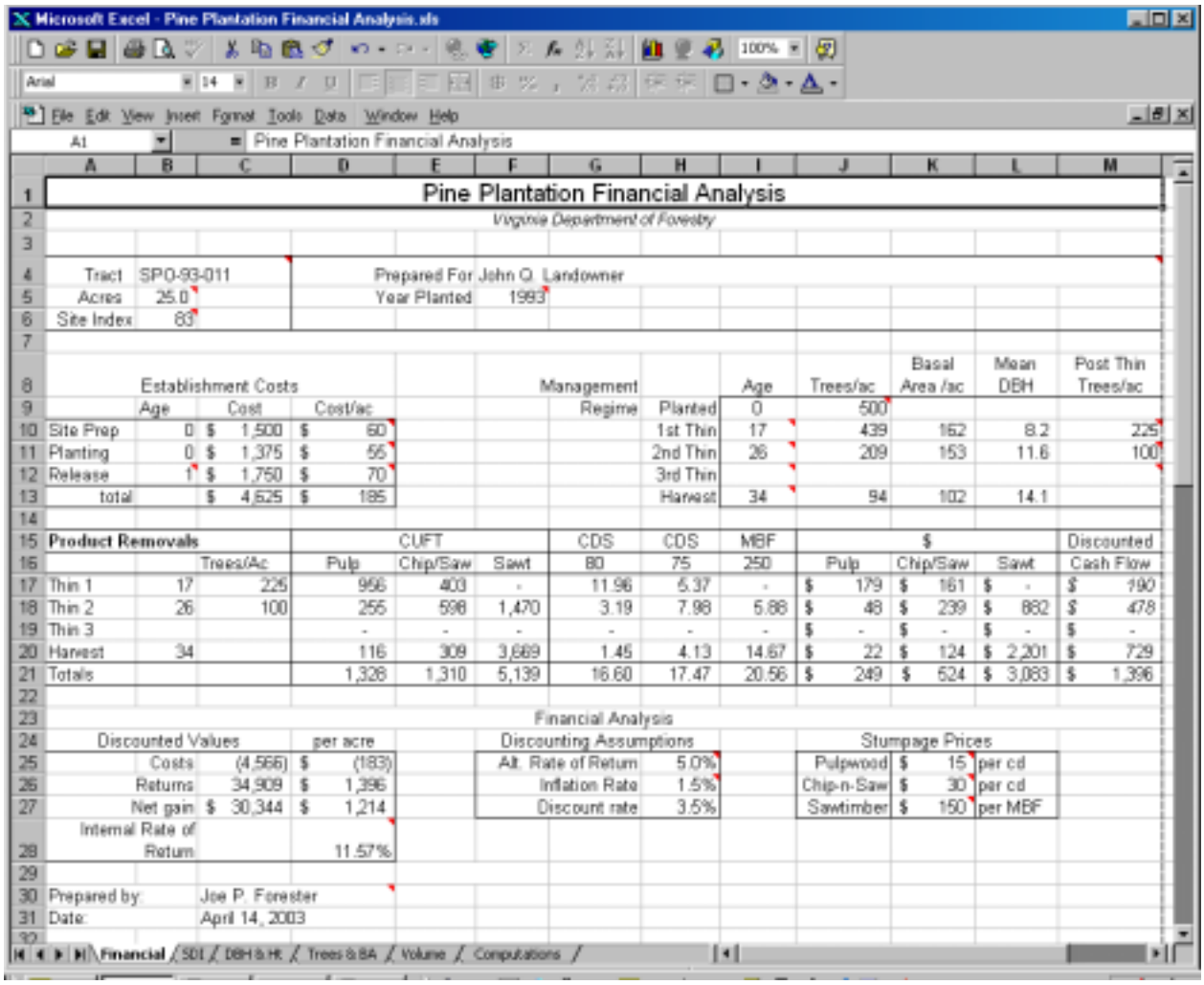
This is where most of the model computations occur. This sheet is entirely protected and the user need not “look behind this curtain”.

Charts

Four charts are provided to present a graphic view of the growth & yield model results.

- DBH & Ht — tracks stand dbh and height over the rotation
- Trees & BA — tracks trees and basal area per acre over the rotation
- Volume — tracks the three merchantable volume measures over time in cubic feet
- SDI — tracks stand density index (SDI) over the rotation.
  (If SDI gets into the red zone this suggests an earlier thinning may be needed to maintain good live crown ratios and tree vigor.)

Figure 1. Pine Plantation Financial Analysis Spreadsheet



Microsoft Excel - Pine Plantation Financial Analysis.xls

Pine Plantation Financial Analysis

Virginia Department of Forestry

Tract	SPO-93-011		Prepared For	John Q. Landowner	
Acres	25.0		Year Planted	1993	
Site Index	83				

Establishment Costs

	Age	Cost	Cost/ac
Site Prep	0	$ 1,500	$ 60
Planting	0	$ 1,375	$ 55
Release	1	$ 1,750	$ 70
total		$ 4,625	$ 185

Management Regime	Planted	Age	Trees/ac	Basal Area /ac	Mean DBH	Post Thin Trees/ac
	0	500				
	1st Thin	17	439	162	8.2	225
	2nd Thin	26	209	153	11.6	100
	3rd Thin					
	Harvest	34	94	102	14.1	

Product Removals	Age	Trees/Ac	CUFT Pulp	CUFT Chip/Saw	CUFT Sawt	CDS 80	CDS 75	MBF 250	$ Pulp	$ Chip/Saw	$ Sawt	Discounted Cash Flow
Thin 1	17	225	956	403	-	11.96	5.37	-	$ 179	$ 161	$ -	$ 190
Thin 2	26	100	255	598	1,470	3.19	7.98	5.88	$ 48	$ 239	$ 882	$ 478
Thin 3			-	-	-	-	-	-	$ -	$ -	$ -	$ -
Harvest	34		116	309	3,669	1.45	4.13	14.67	$ 22	$ 124	$ 2,201	$ 729
Totals			1,328	1,310	5,139	16.60	17.47	20.56	$ 249	$ 524	$ 3,083	$ 1,396

Financial Analysis

Discounted Values		per acre
Costs	(4,566)	$ (183)
Returns	34,909	$ 1,396
Net gain	$ 30,344	$ 1,214
Internal Rate of Return		11.57%

Discounting Assumptions	
Alt. Rate of Return	5.0%
Inflation Rate	1.5%
Discount rate	3.5%

Stumpage Prices		
Pulpwood	$ 15	per cd
Chip-n-Saw	$ 30	per cd
Sawtimber	$ 150	per MBF

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Financial / SDI / DBH & Ht / Trees & BA / Volume / Computations /